PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

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PCT

WRITTEN OPINION

(PCT Rule 66)

Date of Mailing *(day/month/year)*	16 OCT 2001
Applicant's or agent's file reference: 60276-300230	REPLY DUE within TWO months from the above date of mailing

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US01/01595	16 JANUARY 2001	21 JANUARY 2000

International Patent Classification (IPC) or both national classification and IPC
IPC(7): H04N 9/68 and US Cl.: 348/234

Applicant
LIGHTSURF TECHNOLOGIES, INC.

1. This written opinion is the first (first, etc.) drawn by this International Preliminary Examining Authority.

2. This opinion contains indications relating to the following items:

- I [X] Basis of the opinion
- II [ ] Priority
- III [ ] Non-establishment of opinion with regard to novelty, inventive step or industrial applicability
- IV [ ] Lack of unity of invention
- V [X] Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI [ ] Certain documents cited
- VII [ ] Certain defects in the international application
- VIII [ ] Certain observations on the international application

3. The applicant is hereby invited to reply to this opinion.

When? See the time limit indicated above. ~~The applicant may, before the expiration of that time limit, request this Authority to grant an extension., see Rule 66.2(d).~~

How? By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also For an additional opportunity to submit amendments, see Rule 66.4.
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4 *bis*.
For an informal communication with the examiner, see Rule 66.6.

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.

4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: 21 MAY 2002

Name and mailing address of the IPEA/US	Authorized officer
Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	For LUONG NGUYEN
Facsimile No. (703) 305-3230	Telephone No. (703) 308-9297

WRITTEN OPINION

International application No.
PCT/US01/01595

I. Basis of the opinion

1. With regard to the **elements** of the international application:*

[X] the international application as originally filed

[X] the description:
pages 1-50 , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of

[X] the claims:
pages 51-58 , as originally filed
pages NONE , as amended (together with any statement) under Article 19
pages NONE , filed with the demand
pages NONE , filed with the letter of

[X] the drawings:
pages 1-17 , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of

[X] the sequence listing part of the description:
pages NONE , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

[ ] the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

[ ] the language of publication of the international application (under Rule 48.3(b)).

[ ] the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the written opinion was drawn on the basis of the sequence listing:

[ ] contained in the international application in printed form.

[ ] filed together with the international application in computer readable form.

[ ] furnished subsequently to this Authority in written form.

[ ] furnished subsequently to this Authority in computer readable form.

[ ] The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

[ ] The statement that the information recorded in computer readable form is identical to the writen sequence listing has been furnished.

4. [X] The amendments have resulted in the cancellation of:

[X] the description, pages NONE

[X] the claims, Nos. NONE

[X] the drawings, sheets/~~fig~~ NONE

5. [ ] This opinion has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

** Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed".*

WRITTEN OPINION

International application No.
PCT/US01/01595

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. statement

Novelty (N)	Claims	(Please See supplemental sheet)	YES
	Claims	(Please See supplemental sheet)	NO
Inventive Step (IS)	Claims	(Please See supplemental sheet)	YES
	Claims	(Please See supplemental sheet)	NO
Industrial Applicability (IA)	Claims	(Please See supplemental sheet)	YES
	Claims	(Please See supplemental sheet)	NO

2. citations and explanations

Claims 1-7, 11-14, 16, 25-31, 35-38, 40 lack novelty under PCT Article 33(2) as being anticipated by Rabbani et al. (US 5,412,427).

Regarding claims 1 and 26, Rabbani et al. disclose an electronic camera utilizing image compression feedback for improved color processing, comprising receiving an image in a first color space RGB (R, G, B, figures 6-7, column 5, lines 5-35); storing information describing a second color space (Y', (R-Y'), (B-Y') are stored in storage module 28); transforming the image into said second color space (color transformation 14, figures 6-7, column 5, lines 42-56); interpolating the primary channel (interpolation 24, figure 7, column 5, lines 45-56); computing the secondary channels (summers 26a and 26b, figure 7, column 5, lines 45-56).

Regarding claims 2 and 27, Rabbani et al. disclose wherein Green incorporates colors that are substantially green (column 4, lines 10-36).

Regarding claims 3 and 28, Rabbani et al. disclose wherein said second color space comprises a GUV color space (color space Y, (R-Y'), (B-Y'), figure 6).

Regarding claim 4, Rabbani et al. disclose the secondary channels of the first olor space comprise predominantky Red and Blue (figure 6).

Regarding claims 5 and 29, Rabbani et al. disclose an RGB mosaic (figure 4).

Regarding claims 6 and 30, Rabbani et al. disclose a Bayer pattern (figure 4, column 5, line 4).

Regarding claims 7 and 31, Rabbani et al. disclose after the image is transformed into second color space, compressing the transformed image (compression stages 16a, 16b, figure 7, column 5, lines 40-50).

Regarding claims 11 and 35, Rabbani et al. disclose compresing step comprises individually compressing each plane (compression 16a, 16b, 16c, figures 6-7).

Regarding claims 12 and 36, Rabbani et al. disclose transmitting the compressed, transformed image to a target platform (compressed signals could be downloaded to a personal (Continued on Supplemental Sheet.)

Supplemental Box
(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII Sheet 10

TIME LIMIT:

The time limit set for response to a Written Opinion may not be extended. 37 CFR 1.484(d). Any response received after the expiration of the time limit set in the Written Opinion will not be considered in preparing the International Preliminary Examination Report.

V. 1. REASONED STATEMENTS:
The opinion as to Novelty was positive (YES) with respect to claims 8-10, 15, 17-24, 32-34, 39, 41-60.
The opinion as to Novelty was negative (NO) with respect to claims 1-7, 11-14, 16, 25-31, 35-38, 40.
The opinion as to Inventive Step was positive (YES) with respect to claims NONE.
The opinion as to Inventive Step was negative (NO) with respect to claims 1-60.
The opinion as to Industrial Applicability was positive (YES) with respect to claims 1-60 .
The opinion as to Industrial Applicability was negative (NO) with respect to claims NONE.

V. 2. REASONED STATEMENTS - CITATIONS AND EXPLANATIONS (Continued):
computer, column 6, lines 15-20).

Regarding claims 13 and 37, Rabbani et al. disclose computing device (personal computer, column 6, lines 15-20).

Regarding claims 14 and 38, Rabbani et al. disclose desktop computer (personal computer, column 6, lines 15-20).

Regarding claims 16 and 40, Rabbani et al. disclose wire-line transmission (cable interface, column 6, lines 15-20).

Regarding claim 25, Rabbani et al. disclose said transmitting step occurs before the primary channel of the second color cpace is interpreted to full resolution for the image (figure 6).

Claims 17-21 lack an inventive step under PCT Article 33(3) as being obvious over Rabbani et al. (US 5,412,427).

Regarding claim 17, Rabbani et al. fail to disclose restoring said compressed, transformed image at the target platform. However, Rabbani et al. disclose compressed image could be downloaded to the personal computer. Therefore, it would have been obvious to include the step of restoring the compressed image at the computer in order to display the image on the monitor for viewing.

Regarding claims 18-19, Rabbani et al. disclose transforming the non-compressed image into a standard-format color image (JPEG format, column 4, line 60-65).

Regarding claim 20, Rabbani et al. disclose transforming the non-compressed image into YUV color space (figure 6).

Regarding claim 21, Rabbani et al. disclose transforming the non-compressed image into RGB color space (figure 6).

Claims 8-10, 23-24, 32-34 lack an inventive step under PCT Article 33(3) as being obvious over Rabbani et al. (US 5,412,427) in view of Wang et al. (US 5,682,152).

Regarding claims 8 and 32, Rabbani et al. fail to disclose using transform-based compresion. However, Wang et al. teach compression algorithm using DCT (discrete cosine transform) algorithm (column 1, lines 55-60). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to the device in Rabbani et al. by the teaching of Wang et al. in order to transform image in JPEG format.

Regarding claims 9 and 33, Wang et al. disclose wavelet transform-based compression (column 1, lines 55-60).

Regarding claims 10 and 34, Wang et al. disclose DCT based compression (column 1, lines 55-60).

Regarding claim 23, Wang et al. disclose quantization and entropy coding (see abstract).

Regarding claim 24, Wang et al. disclose Huffman coding (see abstract).

Claims 15 and 39 lack an inventive step under PCT Article 33(3) as being obvious over Rabbani et al. (US 5,412,427) in view of Fukuoka (US 5,754,227).

Regarding claims 15 and 39, Rabbani et al. fail to disclose said transmitting step is performed using wireless transmission. However, Fukuoka teaches images captured by the camera can be transferred through the I/O card 15 which

Supplemental Box
(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

functions as modem connected to an on-line service such as American On Line (column 3, lines 50-60). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Rabbani et al. by the teaching of Fukuoka in order to transmit the image to a remote device without using cable.

Claim 22 lacks an inventive step under PCT Article 33(3) as being obvious over Rabbani et al. (US 5,412,427) in view of Tsai et al. (US 5,172,227).

Regarding claim 22, Rabbani et al. fail to disclose applying averaging technique. However, Tsai et al. teach image compression with color interpolation which the missing green pixels are computed by using center-weight average (column 8, lines 7-40). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to the device in Rabbani et al. by the teaching of Tsai et al. in order to compute the missing green pixel.

Claims 41, 43, 48-54, 58-60 lack an inventive step under PCT Article 33(3) as being obvious over Rabbani et al. (US 5,412,427) in view of Bauchspies (US 6,008,847).

Regarding claim 41, Rabbani et al. disclose an electronic camera utilizing image compression feedback for improved color processing, comprising an imager, disclosed as image sensor 40 (figure 7, column 5, lines 1-36); transforming module, disclosed as transformation stage 14 (figure 7, column 5, lines 37-56); compression module (compression stages 16a, 16b, 16c, figure 7, column 5, lines 40-55); a communication link (cable interface, column 6, lines 15-20); target device (personal computer, column 6, lines 15-20). Rabbani et al. fail to disclose a decompression module at the target device. However, Bauchspies teach a temporal compression and decompression system in which the compressed video stream 105 is transmitted over telephone line to a remote computer 92 (target device) for subsequent temporal decompression 106 (figure 2, column 5, lines 40-44). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to the device in Rabbani et al. by the teaching of Bauchspies in order to display the image on the monitor of the computer.

Regarding claim 43, Bauchspies disclose lumimosity information at the image capture at the imager (luminance color space, column 5, lines 50-51).

Regarding claim 48, Rabbani et al. disclose transformed image information in a wire-base manner (cable interface, column 6, lines 15-20).

Regarding claim 49, it is well-known in the art to use a serial communication port in a communication link as a way to transmit data.

Regarding claim 50, Rabbani et al. disclose interpolation module (interpolation 24', figure 3).

Regarding claim 51, Rabbani et al. disclose said interpolation module applies YUV transformation for converting image in YUV color space (figure 3).

Regarding claim 52, Bauchspies discloses a standard-compressed format at the target device (the system using discrete cosine transform (DCT), column 31, lines 34-40).

Regarding claim 53, it is well-known in the art to use JPEG file format in discrete cosine transform (DCT).

Regarding claim 54, it is well-known in the art to use JPEG compression in compressing image.

As for claims 58-60, Rabbani et al. disclose the compressed signals could be downloaded to the personal computer. It would have been obvious that the lower-quality image is converted into higher-quality image in order to let the user could see a quality image.

Claims 42, 55-57 lack an inventive step under PCT Article 33(3) as being obvious over Rabbani et al. (US 5,412,427) in view of Bauchspies (US 6,008,847) further in view of Fukuoka (US 5,754,227).

Supplemental Box
(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Regarding claim 42, Rabbani et al. and Bauchspies fail to disclose wireless communication link. However, Fukuoka teaches image data from camera 30 can be transmitted to computer 33 via cellular phone (wireless communication, figure 3, column 5, lines 40-45).

Regarding claim 55, Fukuoka disclose a digital camera (digital camera 30, figure 3, column 4, lines 34-50); computer (computer 33, figure 3, column 4, lines 34-50); cellular phone (cellular phone, figure 3, column 5, lines 40-45).

Regarding claim 56, Fukuoka disclose said communication link coupled to cellular phone (column 5, lines 40-48).

Regarding claim 57, Fukuoka disclose computer connect to Internet (American On Line, column 3, lines 55-60).

Claims 44-47 lack an inventive step under PCT Article 33(3) as being obvious over Rabbani et al. (US 5,412,427) in view of Bauchspies (US 6,008,847) further in view of Wang et al. (US 5,682,152).

Regarding claim 44, Rabbani et al. and Bauchspies fail to disclose using transform-based module. However, Wang et al. teach compression algorithm using DCT (discrete cosine transform) algorithm (column 1, lines 55-60). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to the device in Rabbani et al. and Bauchspies by the teaching of Wang et al. in order to transform image in JPEG format.

Regarding claim 45, Wang et al. disclose wavelet transform-based compression (column 1, lines 55-60).

Regarding claim 46, Wang et al. disclose DCT based compression (column 1, lines 55-60).

Regarding claim 47, Bauchspies disclose a transformed-based decompression (decompression 106, figure 2, column 5, lines 40-44).

---------- W CITATIONS ----------

US 5,172,227 A AI et al.) 15 DECEMBER 1992, see column 8.
US 5,412,427 A ABBA[illegible] et al.) 02 MAY 1995, see columns 4-6.
US 5,682,152 A NG et al.) 28 OCTOBER 1997, see column 1, and abstract.
US 5,754,227 A KUOKA) 19 MAY 1998, see columns 3, 5.
US 6,008,847 A UCHSPIES) 28 DECEMBER 1999, see columns 5, 31.